MEMORANDUM FOR: Training Officer, OC/OS/T&D 3 November 1962

FROM : Specialist in Programmed Instruction, OTR/A&E

SUBJECT : Instructional programs available in requested areas

1. A few days ago you asked for a list of programmed materials that are currently available in mathematics, trigonometry, algebra, relays, switches, klystrons, and calculus. You also expressed interest in the results of any studies that have been done in evaluating the effectiveness of any of these programs. This memo is a response to this request.

2. Many hundreds of programs are now on the market, and many of these are in the field of mathematics. The list which I have prepared therefore represents a selection as far as the subjects of "mathematics" and "algebra" are concerned. In the areas of "trigonometry", "relays", "switches", "klystrons", and "calculus" there are many fewer programs and the following list is as complete as I could make it.

3. Fortunately almost all of the programs are not only listed but rather fully described in a single volume, "Programs, '62: A Guide to Programed Instructional Materials Available to Educators by September 1962". Additional copies may be purchased from the Superintendent of Documents, U.S. Government Printing Office, for $1.50.

4. To save space in the list, I have merely included the name of those programs which are described in "Programs, '62", together with the page in the volume on which the description begins. For what they may be worth, I then add a few comments of my own:

## ALGEBRA

Adventures in Algebra, by Norman A. Crowder and Grace C. Martin. This is the 348 page TutorText with which you are already familiar. (See page 113 of Programs, '62)

Your Personal Tutor in Algebra, by Harold L. Moon and the staff of the Institute for International Research and Development (INRAD). This is another program that you've had in hand. Published in 1959, it was among the very first programs to become commercially available. Although the state of the art has improved since then, Dr. Moon and his associates were well qualified to produce such a text, which is still being widely sold today, despite growing competition. It costs only $5.50 and, though it claims to be a complete first college course -- covering one entire academic year -- it fits in your coat pocket. I think it would be well worth trying. (It is not described in Programs, '62).

Algebra I and Algebra II (See pages 137 and 148 of Programs, '62)

Although it is not clear from the description, it is not necessary for a student to use a teaching machine with these materials. The materials come with a special binder and moveable slide which serve the purpose, quite inexpensively, of keeping the student from seein g the answers. Of course, the student is expected to write in his answers and, if he does, the program must be discarded. If many students are to study these materials at varying times, it might be much less expensive to use the KONCEPT-O-GRAPH machine, which would make the materials reusable. I have sample TEMAC binders, detailed statements of objectives, tables of contents, for both of these programs. I also have single copies of each program. (My records show that you now have Algebra I on loan. Right?) My impression of the Enclycopaedia Britannica Films, Inc., people who are developing these programs is that they have been doing a highly creditable job. All of their programs are thoroughly tested before they are published. So I think you could also use this series with confidence. But, of course, it is still important to examine the materials in detail to see what kind of "algebra" your students would learn. My understanding is that he would be learning traditional algebra, not modern algebra. If this makes a difference, you should choose other programs.

Fundamentals of Algebra I and Fundamentals of Algebra II (See pages 159 and 162 in Programs, '62) It's also not clear, but neither is it necessary for TMI programs to have a teaching machine. You may order either program in programmed text format. My records show that you have Algebra I, so you are already familiar also with this program. TMI has not publicized the way EBF has the extent of their effort at pre-testing and try-out. But knowing the reputation of the men who are in charge of their programming effort, I believe that these programs may be of equal quality with those of EBF.

NOTE: I have not included any algebra programs which require teaching machines. I also have not mentioned any which are still under development.

## TRIGONOMETRY

Trigonometry (an Introductory Course) This is another EBF program. (See page 257 in Programs, '62) They are working on a college course in trigonometry, but it is not out yet.

Trigonometry: A Practical Course This is another in the series of DoubleDay TutorTexts. I know little about it, except that my wife tried it (we have a copy at home which I'd be glad to let you examine) and got bored because there was so much emphasis on the use of trigonometric tables. It's available in local bookstores.

NOTE: Several more programs in this field ought to become available within a few months. McGraw-Hill, Appleton-Century-Crofts, and Henry Holt are all in various stages of preparing programs in trigonometry. And there's the EBF program, mentioned above.

## CALCULUS

Introductory Calculus I & II (not described in Programs, '62) These programs, developed by EBF, are designed for grades 11 and up. They were prepared by traditional, not modern mathematicians. Their purpose is to "give facility in the use of the basic tools of the calculus, and a mastery of the fundamanetal principles from which these tools are developed. Each sells at about $7.00, and is available from Encyclopaédia Britannica Press, 425 North Michigan Avenue, Chicago 11, Illinois. I do not have a copy of either one. Related subjects under development, but not yet available, by the same company are Intermediate Calculus and Differential Equations.

NOTE: Learning, Inc., and TMI-Grolier are both preparing programmed materials in calculus.

## MATHEMATICS

Practical Mathematics, by Grace C. Martin and Ann Smalley. This is another TutorText, which I know nothing about, except that it is published and available. It is not described in Programs, '62.

Basic Mathematics, by Daniel G. Bobrow, is also not described in Programs, '62. Developed by EBF, it is aimed at the typical ninth grade. It starts with an extensive review of the fundamental processes of arithmetic, and goes no higher than multiplying fractions, dividing decimals, figuring percentages, and so on. It's 3445 frames long, takes the average student about 110 hours, and costs $9.25. It sounds as though it is too elementary for you, but I wasn't sure, so included it. Further details are available.

Modern Mathematics (See page 121 of Programs, '62) This program was developed by the Center for Programmed Instruction, which should have turned out a good piece of work. I have a copy of this program.

Introduction to Modern Mathematics (See page 167 of Programs, '62) The cost of the programmed text form of these materials is $8.50.

Modern Mathematics: Number Systems, developed by TMI-Grolier. I know nothing but its title and the fact that the programmed text format is $11.00.

An Introduction to Groups and Fields, by McGraw-Hill. (See page 269 of Programs, '62).

Sets, Relations, and Functions, also by McGraw-Hill. (See page 236 of Programs, '62). Both of these programs should be good ones.

Modern Mathematics, published by Science Research Associates, 259 East Erie Street, Chicago 11, Illinois. This is an 8,000 frame program designed for the 9th-12th grades. It sells for $10.00.

NOTE: The Billerett Company is preparing a program on Set Theory, McGraw-Hill is preparing one on Mathematical Logic, and so on.

## RELAYS, SWITCHES, KLYSTRONS, AND SO ON

Relays, published by Varian Associates (See page 343 of Programs, '62). This is short, but it ought to be excellent.

Switches, also by Varian Associates (See page 345). Again, this should be excellent.

Klystrons, once more, by Varian Associates (See page 341). Excellent, probably.

Capacitance and capacitors, again by Varian Associates (See page 340). I'm judging all of these programs to be excellent because I know that the calibre of their work is high. I should expect both careful analysis and careful programming on all of these.

NOTE: There is likely to be a rapid increase in number and variety of technical programs of this short, pointedly-purposed sort. As examples, Federal Electric Corporation is about ready to release "Transistors for Computers and You"; TMI-Grolier is working on a program entitled, "Transistor Theory"; the Atva Corporation is preparing, "The Basic Theory of Transistors"; McGraw-Hill is going to offer, "Semi-Conductor and Transistor Theory", "Basic Pulse Circuits", "Basic Industrial Electronics Circuits"; and TMI-Grolier is programming, "Vacuum Tubes".

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